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test. Even those who feel dissatisfied with such a psychologizing ethics of enjoyment will appreciate on every page the tart formulation of the argument. In its merits as well as in its limitations it strongly reminds the reader of Perry's *Moral Economy*. Every chapter is supplemented by a well-chosen list of detailed references to the ethical literature in the English language.

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ANIMAL EXPERIMENTATION AND MEDICAL PROGRESS. Professor W. WILLIAMS KEEN, M.D., LL.D. With an introduction by President C. W. ELIOT, LL.D. The Houghton Mifflin Co. 1914. REPORT OF THE ROYAL COMMISSION ON VIVISECTION. Presented to both Houses of Parliament, 1912.

Under the above title Dr. Keen has republished a collection of essays written by him over a series of years from 1885 to 1914, dealing with certain aspects of what is generally, but not very accurately, described as "the vivisection question." The author apologizes for the rather wearisome repetition involved in such republication of collected papers, each of which was deemed to be "complete in itself," but he justifies such reiteration as antidotal to "the constantly repeated misstatements by the opponents of experimental research in spite of public exposure of these misstatements."

The volume has a commendatory foreword by President Eliot, which speaks of "the very interesting manner" in which Dr. Keen describes "the new surgery of the last forty years and its extraordinarily beneficent results." "The new surgery has been made possible," we are told, "by the combination of anæsthesia and asepticism," and "these immense benefits" are "due to animal experimentation." On the ethical side of the question President Eliot assures us that the "sacrifices of animal life or happiness" are "always made as painless as possible," and he asks, "How many rabbits or guinea-pigs is it justifiable to incommode or kill in order to save the life of a child attacked by diphtheria? How many monkeys would a competent experimenter be justified in sacrificing, in order to find a sure treatment for infantile paralysis?" The reasonable answer to all such questions is to be found, according to President Eliot, in Dr. Keen's pages.

About one-third of the book is devoted to criticism and exposition of the methods of certain anti-vivisectionist writers. Dr. Keen

undoubtedly convicts many of his opponents of inaccuracy and blameworthy carelessness, if not of wilful misrepresentation. He quotes with approval from the very valuable Report of the British Royal Commission on Vivisection, published in 1912, a statement as to misleading descriptions and illustrations issued by certain opponents of the practice, whose zeal had clearly outrun their discretion. As this British Report is the most recent official, and, we would add, judicial and impartial, pronouncement on this *questio vexata*, it might be wished that Dr. Keen had made greater use of its findings, which were the fruit of some six years' labor and the examination of eminent witnesses representative of "every class of opinion interested" in the question.

Nearly all the claims made on behalf of vivisection dealt with by Dr. Keen are here passed under review—antiseptics, anæsthetics, new drugs, the new surgery, especially in its application to the brain, the abdomen, the nerves and blood-vessels; the treatment and prevention of infectious diseases of man and animals—hydrophobia, tuberculosis, tetanus, myxedema—all these were duly considered by the British Commissioners. The conclusions at which they arrive ("apart altogether from the moral and ethical questions involved") are:

"(1) That certain results claimed from time to time to have been proved by experiments upon living animals and alleged to have been beneficial in preventing or curing disease, have, on further investigation and experience, been found to be fallacious or useless.

(2) That notwithstanding such failures, valuable knowledge has been acquired in regard to physiological processes and the causation of disease, and that useful methods for the prevention, cure, and treatment of certain diseases have resulted from experimental investigations upon living animals.

(3) That, as far as we can judge, it is highly improbable that, without experiments made on animals, mankind would at the present time have been in possession of such knowledge.

(4) That, in so far as disease has been successfully prevented or its mortality reduced, suffering has been diminished in man and in lower animals.

(5) That there is ground for believing that similar methods of investigation if pursued in the future will be attended with similar results."¹

¹ Final Report of the Royal Commission (Cd. 6114), p. 47.

The Commissioners have no doubt that "the great preponderance of medical and scientific authority is against the opponents of vivisection," and that it is more markedly so now than was the case thirty or forty years ago. Biology, or the science of living things, and its application to medicine and surgery, are in fact advanced like other sciences by observation and experiment, i.e. by finding facts or procuring them. Unlike other sciences, however, experiment is here, in the absence of anæsthetics, often confronted with the element of pain, and "its infliction at once introduces moral or ethical considerations which have no counterpart in the scientific pursuits of the chemist or the physicist."² Comparing Dr. Keen's contentions with the findings of the Commission on the scientific part of the question, we observe that on the whole the latter are more guarded and critical than the former, the shadows are painted as well as the high lights. Thus in regard to anæsthetics the Commission state, "The discovery of anæsthetics owes nothing to experiments on animals."³ In regard to antiseptic and aseptic surgery, due homage is paid to Pasteur and Lister; but the fact that Semmelweis anticipated both in the matter of surgical cleanliness is also referred to,⁴ and he, according to his able biographer, ignored experiments on animals.⁵ Again, while Dr. Keen and the British Commission alike give due credit to Koch for his work on tuberculosis, the latter do not hesitate to speak of the treatment of consumption on his lines as "a vast failure,"⁶ and ascribe to general "improvement in sanitary conditions" the steady decrease which has taken place in that disease. So also the untoward results which accompanied the use of Haffkine's anti-cholera vaccine in India, and the criticism of Sir Almroth Wright's anti-typhoid vaccine statistics by Professor Karl Pearson, are referred to in the British Report. In all these cases, as in the case of other claims made on behalf of vivisection, the Commissioners set out the contentions of those who give the whole or chief credit to experiments on animals, along with any counter statements or alleged failures or untoward results urged on the other side; but they do not appear, except so far as the general conclusions above quoted go, to commit themselves to the enthusiastic endorsement of the particular claims on behalf of vivisection which we find so repeatedly made in the pages of Dr. Keen.

The system of restriction by law of the practice of vivisection, which has been operative in Great Britain since 1875, and which was at first strongly resented by physiologists and pathologists,

² Final Report of the Royal Commission (Cd. 6114), p. 21. ³ *Ibid.*, p. 26.

⁴ Sir Wm. Sinclair, *Life of Semmelweis*, 1909. ⁵ Report of R. C., p. 31.

is not apparently now regarded in that country otherwise than favorably by leading scientists and medical men.⁶ True, Sir William Osler spoke of such restriction as "a standing insult to the humanity" of those in charge of physiological laboratories, in whose hands he thought the matter might be safely left; while Dr. Pembrey held that "the limitations of the Act are against research." The Commissioners, however, denounced some of the latter's views in regard to painful experiments as "absolutely reprehensible," and held that "to grant a license or certificates to any person holding such views as those formerly expressed (1875) by Dr. Klein and as those entertained by Dr. Pembrey, is calculated to create serious misgiving in the minds of the public."⁷

Dr. Keen asks, "Is it not wrong so to hinder research, when in the vast majority of instances animals suffer little or nothing?"⁸ We apprehend that no one is opposed to research or experiment as such, but that it is the infliction of pain which complicates and dominates the whole question. The former British Commission of 1875 alleged that "it is not to be doubted that inhumanity may be found in persons of very high position as physiologists"; and we gather from Dr. Keen that while he asserts that in the case of syphilis, "of course, no experiments on human beings are allowable,"⁹ we also learn that, nevertheless, such appear in fact to have been made by a certain Dr. Neisser.¹⁰ Here we at once pass from medicine to morals, and must address ourselves to the ethical side of this very difficult problem.

The British Commission assert that "the quest for knowledge may, of course, conflict with moral principle," and cite the case of judicial torture, which was discarded "not because it did not lead to useful knowledge, but because, however useful the result, the means could no longer be justified." Human vivisection, practised in ancient Egypt, comes under the same condemnation. The average moral sense of contemporary Christianity is however not offended by "the sacrifice of lower animals for the food, clothing, adornment, and, within limits, the sport of man." Painless sacrifice of animals for purposes of experimental research clearly cannot be condemned or forbidden by law so long as the aforesaid practices are approved or permitted. The Commissioners clearly differentiate between painless sacrifice of animals for research and the pursuit of research despite the supervention of pain and perhaps of prolonged and severe suffering; a distinction which seems

⁶ Report of R. C., pp. 63, 67.

⁷ *Ibid.*, p. 20.

⁸ Dr. Keen, p. 108.

⁹ *Ibid.*, p. xi.

¹⁰ *Ibid.*, p. 127.

insufficiently appreciated both by Dr. Keen and by the distinguished author of his preface. The Commission "strongly hold that limits should be placed to animal suffering in the search for physiological or pathological knowledge," but that "experiments upon animals, adequately safeguarded by law, faithfully administered, are morally justifiable and should not be prohibited by legislation." At this point the unanimity of the British Commission appears to have broken down, and three of their number in a dissentient memorandum carry these findings farther than is the case with the remaining five.

On the question of pain, whether due to the after-effects of some inoculatory procedure or to keeping the animal alive after recovery from a surgical operation under anæsthesia, there is considerable support among the eminent witnesses who appeared before the British Commission in favor of Dr. Keen's contention that the great bulk of so-called vivisection experiments are, or ought to be, painless, or at most productive of but little suffering or discomfort. There is much force in the view maintained by the three dissentient Commissioners:

"The evidence appears to us to be conclusive that such experimental investigation upon living animals as is now generally deemed essential or necessary can be performed either painlessly under anæsthetics or under an imperative requirement that, should obvious suffering result, the animal shall be forthwith painlessly killed."¹¹

The question thus becomes narrowed down to this: Are there instances in which the pursuit of physiological or medical science demands the continuation of experiment or the preservation of the life of the animal, *although a state of obvious suffering or enduring pain has supervened*? Everybody would be relieved if this question could be answered in the negative. If that is not possible, there will probably be in most communities, as there was in the British Commission, a cleavage of opinion. This appears to be, on the ethical side of the question, the real point at issue, and one which is apt to be overlooked or minimized when reading with due appreciation the beneficent story of the progress of modern surgery which Dr. Keen is so well able to tell, and which, in his collected essays, he has related with the enthusiasm which that progress can never fail to inspire.

¹¹ Report of R. C., p. 70.